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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,029	02/14/2001	Jae-Ho Moon	P56310	8245

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EXAMINER

HUFFMAN, JULIAN D

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/782,029	MOON ET AL.	
	Examiner	Art Unit	
	Julian D. Huffman	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 15-19 and 23-35 is/are pending in the application.
- 4a) Of the above claim(s) 23-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 5, 7, 8, 10, 15-19, 26 and 28-35 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 6, 9 and 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Election/Restrictions

1. Claims 23-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group, there being no allowable generic or linking claim. Applicant timely traversed the restriction requirement in Paper No. 6.

Applicant's election with traverse of the restriction requirement in paper number 6 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terui et al. (U.S. 6,390,606 B1).

Terui et al. discloses an ink-jet printhead comprising:

a substrate being a single integrated monolithic and homogenous unit of silicon (fig. 11, element 1), said substrate, having a rear surface, said rear surface having a channel (10) having a predetermined depth, wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said substrate (fig. 4, element 109);

a nozzle plate (8) coupled to a front surface of the substrate, said nozzle plate being perforated by a plurality of chamber-orifice complex holes (9), wherein each

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chamber-orifice complex hole corresponds to at least one of said plurality of ink feed holes; and

a plurality of heaters (2) having signal lines, the heaters being disposed on the front surface of the substrate, each one of said plurality of heaters being located near corresponding ones of said plurality of chamber-orifice complex holes, wherein each one of said plurality of heaters is formed at a center portion of a region corresponding to one of said plurality of chamber-orifice complex holes and said at least one ink feed hole is formed on one side of said heater.

With regards to claim 26, though Terui et al. may not disclose all of the method steps claimed, it is the patentability of the product claimed and not of the recited process steps which must be established. When the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based on either section 102 or 103 of the statute is eminently fair and acceptable. MPEP 2113, *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

4. Claims 15-17, 19, 29, 31, 32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weber et al.

Weber et al. discloses an ink-jet printhead comprising:

a substrate (fig. 2, element 23) having a front side and a back side opposite to said front side, wherein said back side comprises a channel (40) along an entire length of said substrate, said channel having a bottom wherein a plurality of holes (42) perforate through to said front side of said substrate;

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a plurality of heaters (34), each electrically connected to a pair of signal lines disposed on said front side of said substrate, each one of said plurality of heaters being located near at least one of said plurality of holes in said substrate;

a nozzle plate (22) perforated by a plurality of nozzle holes (16), said nozzle plate having a bottom side attached to said front side of said substrate so that each one of said plurality of nozzle holes exposes corresponding ones of said plurality of heaters and so that each one of said plurality of nozzle holes exposes at least one of said plurality of holes perforating said substrate, each of said plurality of nozzle holes having a conical, frustum-shaped section and a cylindrical section, said frustum-shaped section being at a top side of said nozzle plate and said cylindrical section being near said bottom side of said nozzle plate, each of said plurality of nozzle holes having a first diameter at said top side of said substrate and a second and larger diameter on said bottom side of said substrate, said frustum-shaped section of each nozzle hole joining with said cylindrical section of each nozzle hole at a location between said top side and said bottom side of said nozzle plate and at a point where a diameter of said nozzle plate is equal to said second diameter (one could cut out a small enough section anywhere along the frustum shaped area and form a cylindrical section).

With regards to claims 16, 31 and 34, each heater is adjacent to two of said plurality of holes perforating said substrate (fig. 2).

With regards to claim 17, each heater is adjacent to corresponding ones of said plurality of holes perforating said substrate, each one of said plurality of heaters being disposed on said front side of said substrate, each corresponding ones of said plurality

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of heaters and each one of said plurality of holes perforating said front side of said substrate being aligned to a corresponding one of said plurality of holes perforating said nozzle plate (fig. 2).

With regards to claims 29, 31, 32 and 34, though Weber et al. may not disclose all of the method steps claimed, it is the patentability of the product claimed and not of the recited process steps which must be established. When the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based on either section 102 or 103 of the statute is eminently fair and acceptable. MPEP 2113, *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

5. Claims 15, 17, 19, 29, 32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (U.S. 6,209,993 B1).

Wang et al. discloses an inkjet printhead comprising :

a substrate (fig. 1c, element 100), being a single homogenous integrated monolithic unit of silicon, having a front side and a back side opposite to said front side, wherein said back side comprises a channel (102) along an entire length of said substrate, said channel having a bottom wherein a plurality of holes (104) perforate through to said front side of said substrate;

a plurality of heaters (112), each electrically connected to a pair of signal lines disposed on said front side of said substrate, each one of said plurality of heaters being located near at least one of said plurality of holes in said substrate;

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a nozzle plate (fig. 1c) perforated by a plurality of nozzle holes, said nozzle plate having a bottom side attached to said front side of said substrate so that each one of said plurality of nozzle holes exposes corresponding ones of said plurality of heaters and so that each one of said plurality of nozzle holes exposes at least one of said plurality of holes perforating said substrate, each of said plurality of nozzle holes having a conical, frustum-shaped section and a cylindrical section, said frustum-shaped section being at a top side of said nozzle plate and said cylindrical section being near said bottom side of said nozzle plate, each of said plurality of nozzle holes having a first diameter at said top side of said substrate and a second and larger diameter on said bottom side of said substrate, said frustum-shaped section of each nozzle hole joining with said cylindrical section of each nozzle hole at a location between said top side and said bottom side of said nozzle plate and at a point where a diameter of said nozzle plate is equal to said second diameter (one could cut out a small enough section anywhere along the frustum shaped area and form a cylindrical section).

With regards to claim 17, each heater is adjacent to corresponding ones of said plurality of holes perforating said substrate, each one of said plurality of heaters being disposed on said front side of said substrate, each corresponding ones of said plurality of heaters and each one of said plurality of holes perforating said front side of said substrate being aligned to a corresponding one of said plurality of holes perforating said nozzle plate (fig. 1c).

With regards to claims 29 and 32, though Wang et al. may not disclose all of the method steps claimed, it is the patentability of the product claimed and not of the recited

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process steps which must be established. When the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based on either section 102 or 103 of the statute is eminently fair and acceptable. MPEP 2113, *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

6. Claims 1, 4 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al.

Wang et al. discloses an ink-jet printhead comprising:

a substrate being a single integrated monolithic and homogenous unit of silicon (fig. 1c, element 100), said substrate, having a rear surface, said rear surface having a channel (102) having a predetermined depth, wherein a plurality of ink feed holes (101) are formed on a bottom of the channel perforating said substrate;

a nozzle plate (fig. 1c) coupled to a front surface of the substrate, said nozzle plate being perforated by a plurality of chamber-orifice complex holes, wherein each chamber-orifice complex hole corresponds to at least one of said plurality of ink feed holes; and

a plurality of heaters (112) having signal lines, the heaters being disposed on the front surface of the substrate, each one of said plurality of heaters being located near corresponding ones of said plurality of chamber-orifice complex holes, wherein each one of said plurality of heaters is formed at a center portion of a region corresponding to one of said plurality of chamber-orifice complex holes and said at least one ink feed hole is formed on one side of said heater.

With regards to claim 26 though Wang et al. may not disclose all of the method steps claimed, it is the patentability of the product claimed and not of the recited process steps which must be established. When the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based on either section 102 or 103 of the statute is eminently fair and acceptable. MPEP 2113, *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

7. Claims 18, 30 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weber et al. as applied to claims 15, 29 and 32 above and further in view of Abe et al.

Weber et al. discloses an embodiment wherein the heater surrounds the ink feed hole (fig. 4). This embodiment is similar to the other embodiment with the exception of only providing one ink feed hole per heater.

Weber et al. does not expressly disclose an omega shaped heater, however Weber does teach that any resistor shape may be used in the invention (column 6, lines 3-6).

Abe et al. discloses an omega shaped heater (fig. 17c).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the resistor of Abe et al. into the invention of Weber et al. The reason for performing the modification would have been to improve the lifetime of the head by reducing cavitation damage to the heating element (column 14, lines 20-40).

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8. Claims 5, 7, 8, 10 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. as applied to claims 1 and 26 above, and further in view of Milligan et al. (U.S. 6,273,557 B1).

Wang et al. discloses each chamber-orifice having a truncated conical shape, wherein a lower end of said chamber orifice facing said substrate faces the corresponding ink feed hole and heater formed on the substrate and the other end having a smaller diameter faces toward an outside of said ink-jet printhead (fig. 1c), wherein an expanded chamber having a predetermined diameter is disposed at the lower portion of the chamber-orifice complex hole (fig. 1c).

Wang et al. does not disclose ink feed holes on both sides of the heater.

However, Milligan et al. discloses this (fig. 8a, column 6, lines 14-24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide two ink feed holes as taught by Milligan et al. into the invention of Wang et al. The reason for performing the modification would have been to provide a means to filter the ink such that if one side becomes clogged ink may still reach the heater resistor from the other side (column 6, lines 14-24).

Response to Amendment

9. The amendment filed 3 July 2002 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment

shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The new paragraph inserted between paragraph 57 and paragraph 58 introduces the following new matter into the disclosure:

The steps which outline the manner in which the device is made recite the order in which the steps are performed. The originally filed claims 23-25 do not disclose the order in which the steps are performed and thus the order represents new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

10. Applicant argues that Weber does not disclose a substrate being a single integrated monolithic and homogenous unit of silicon, said substrate having a rear surface, said rear surface having a channel having a predetermined depth, wherein a plurality of ink feed holes are formed on a bottom of the channel perforating the substrate. This limitation is presented by amendment and is addressed herein under a new grounds of rejection as necessitated by amendment.

Applicant argues that Weber does not disclose the lower portion of the nozzle holes being cylindrical as opposed to frustum shaped. Applicant further states that this limitation was presented in claim 22 and previously overlooked by the examiner. The examiner respectfully disagrees. Claim 22 includes the language "wherein each one of said plurality of nozzle holes perforating said nozzle plate is essentially conical in shape". This is clearly different from the claim language provided in claim 15. Further,

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the examiner rejected this claim in paragraph 8 of the prior office action, but did not mention the limitation specifically since it was clearly shown in the figures of the Weber reference (figs. 2, 4, 6 and 8, which show conical shaped nozzle holes in the nozzle plate).

With regards to applicant's new claim language in claim 15, which is clearly different from that presented previously, the language is not seen to clearly distinguish over the Weber reference. The claim language in claim 15 recites "each of said plurality of nozzle holes having a conical, frustum-shaped section and a cylindrical section". Weber discloses the conical, frustum shaped section, and also a section of the conical, frustum-shaped nozzle could also be describe as being cylindrical. Further, one could cut out a small enough section anywhere along the frustum shaped area and form a cylindrical section. Thus, applicant's claim language is not believed to overcome the Weber reference.

Allowable Subject Matter

11. Claims 2, 3, 6, 9 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With regards to claim 2, 3, 6, 9 and 27, the prior art of record does not disclose a substrate being a single integrated monolithic and homogenous unit of silicon with a plurality of heaters surrounding a plurality of ink feed holes.

Conclusion

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12. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (703) 308-6556. The examiner can normally be reached on Monday through Friday from 9:30 a.m. to 6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow, can be reached at (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722. Faxes requiring the immediate attention of the examiner may be sent directly to the examiner at (703) 746-4386. Note that this number will not automatically send a confirmation that the fax was received.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



JH

September 5, 2002



John Barlow
Supervisory Patent Examiner
Technology Center 2800